PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
UPN-P3067PCT		
International application No:	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US2004/016614	15/06/2004	20/06/2003

Applicant

THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 9 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
      [ ] The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
   b. [X] With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. [ ] **Certain claims were found unsearchable** (See Box II).

3. [X] **Unity of invention is lacking** (see Box III).

4. With regard to the **title,**
   [X] the text is approved as submitted by the applicant.
   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**
   [X] the text is approved as submitted by the applicant.
   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings,**
   a. the figure of the **drawings** to be published with the abstract is Figure No. 1
      [ ] as suggested by the applicant.
      [X] as selected by this Authority, because the applicant failed to suggest a figure.
      [ ] as selected by this Authority, because this figure better characterizes the invention.
   b. [ ] none of the figures is to be published with the abstract.

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International application No.
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Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-19

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

Invention 1: claims 1-19

Chimeric adenovirus comprising ITRs, E1a, E1b and E4 from a first adenovirus and an internal region comprising genes encoding penton,hexon and fiber from a second adenovirus; host cell comprising said chimeric adenovirus; method of generating said chimeric adenovirus; method of culturing a chimeric adenovirus comprising ITRs from a first adenovirus and an internal region comprising genes encoding penton,hexon and fiber from a second adenovirus.

Invention 2: claim 20

Simian adenovirus 18 (SA18) genomic sequence of SEQ ID No: 12 or complementary nucleic acids

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Inventions 3-32: claims 21-43(partial)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

nucleic acid consisting of the corresponding SA18 region listed in claim 21; protein encoded by said nucleic acid; composition comprising a capsid protein where this applies; nucleic acid molecule comprising a said region as heterologous sequence; pharmaceutical composition comprising said nucleic acid molecule; recombinnt adenovirus comprising a protein selected from hexon, penton, fiber from SA18; host cell comprising a heterologous nucleic acid comprising said nucleic acid; host cell expressing gene products from said region; composition comprising said recombinant virus; method for delivering a heterologous gene; method for repeat administration of a heterologous gene; method for producing a selected gene product; method for eliciting an immune response;
where the each of the corresponding SA18 (SEQ ID No. 12) regions listed in claim 21 and, where applying, claims referring thereto represents a separate invention, namely:
invention 3: 5' inverted terminal repeat (ITR)
invention 4: E1a region
invention 5: E1a 13S region
invention 6: E1a 12S region
invention 7: E1a 9S region
invention 8: E1b region
invention 9: small T region
invention 10: large T region
invention 11: protein IX region
invention 12: protein IVa2 region
invention 13: E2b region
invention 14: L1 region
invention 15: 28.1 kD protein region
invention 16: polymerase region
invention 17: agnoprotein region
invention 18: 52/55 kD protein region
invention 19: protein IIIa region
invention 20: L2 region
invention 21: penton region
invention 22: protein VII region
invention 23: protein VI region
invention 24: protein Mu region
invention 25: L3 region
invention 26: hexon protein region
invention 27: endoprotease region
invention 28: 2a protein region
invention 29: L4 region
invention 30: 100 kD protein region
invention 31: 33 kD protein homolog region
invention 32: protein VIII region

Inventions 33-53: claims 21-43(partial)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

nucleic acid consisting of the corresponding SA18 region listed in claim 21; protein encoded by said nucleic acid; composition comprising a capsid protein where this applies; nucleic acid molecule comprising a said region as heterologous sequence; pharmaceutical composition comprising said nucleic acid molecule; recombinnt adenovirus comprising a protein selected from hexon, penton, fiber from SA18; host cell comprising a heterologous nucleic acid comprising said nucleic acid; host cell expressing gene products from said region; composition comprising said recombinant virus; method for delivering a heterologous gene; method for repeat administration of a heterologous gene; method for producing a selected gene product; method for eliciting an immune response;
where the each of the corresponding SA18 (SEQ ID No. 12) regions listed in claim 21 and, where applying, claims referring thereto represents a separate invention, namely:
invention 33: E3 region
invention 34: E3 ORF1 region
invention 35: E3 ORF2 region
invention 36: E3 ORF3 region
invention 37: E3 ORF4 region
invention 38: E3 ORF5 region
invention 39: E3 ORF6 region
invention 40: E3 ORF7 region
invention 41: E3 ORF8 region
invention 42: E3 ORF9 region
invention 43: L5 region
invention 44: fiber protein region
invention 45: E4 region
invention 46: E4 ORF1 region
invention 47: E4 ORF2 region
invention 48: E4 ORF3 region
invention 49: E4 ORF4 region
invention 50: E4 ORF5 region
invention 51: E4 ORF6 region
invention 52: E4 ORF7 region
invention 53: 3'-ITR

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International Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C12N15/86 C12N5/10 C12N7/01 C07K14/075 A61K39/235
A61K48/00 C12N15/34

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C12N C07K A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, BIOSIS, EMBASE, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 00/03029 A (INTROGENE BV) 20 January 2000 (2000-01-20) the whole document -----	1-19
A	YOUIL RIMA ET AL: "Hexon gene switch strategy for the generation of chimeric recombinant adenovirus" HUMAN GENE THERAPY, vol. 13, no. 2, 20 January 2002 (2002-01-20), pages 311-320, XP002301537 ISSN: 1043-0342 cited in the application the whole document -----	1-19

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 October 2004	12 04. 2005

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Brenz Verca, S

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Form PCT/ISA/210 (second sheet) (January 2004)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WU HONGJU ET AL: "Construction and characterization of adenovirus serotype 5 packaged by serotype 3 hexon." JOURNAL OF VIROLOGY, vol. 76, no. 24, December 2002 (2002-12), pages 12775-12782, XP002301538 ISSN: 0022-538X the whole document	1-19
A	WO 03/046124 A (TRUSTEES OF THE UNIVERSITY OF ; GAO GUANGPING (US); ROY SOUMITRA (US);) 5 June 2003 (2003-06-05) cited in the application the whole document	
A	FARINA S F ET AL: "Replication-defective vector based on a Chimpanzee adenovirus" JOURNAL OF VIROLOGY, THE AMERICAN SOCIETY FOR MICROBIOLOGY, US, vol. 75, no. 23, December 2001 (2001-12), pages 11603-11613, XP002957497 ISSN: 0022-538X How to buy a simian adenovirus strain from ATCC and sequence the virus genome the whole document	
A	STEVENS D.: "American Type Culture Collection Catalogue of strains II: Viruses and antisera" 1983, AMERICAN TYPE CULTURE COLLECTION , ROCKVILLE MARYLAND , XP002301508 Simian adenovirus 18 ATCC VR-943 page 227, paragraph 1	
P,A	ROY SOUMITRA ET AL: "Characterization of a family of chimpanzee adenoviruses and development of molecular clones for gene transfer vectors" HUMAN GENE THERAPY, vol. 15, no. 5, May 2004 (2004-05), pages 519-530, XP002301507 ISSN: 1043-0342 cited in the application the whole document	

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Information on patent family members

International Application No
PCT/US2004/016614

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO 0003029 A	20-01-2000	EP	0976833 A1	02-02-2000
		AU	765276 B2	11-09-2003
		AU	4935699 A	01-02-2000
		CA	2303477 A1	20-01-2000
		EP	0978566 A2	09-02-2000
		JP	2002520026 T	09-07-2002
		WO	0003029 A2	20-01-2000
		NZ	503018 A	30-06-2003
		US	2003017138 A1	23-01-2003
		US	2004043489 A1	04-03-2004
		US	2003073072 A1	17-04-2003
WO 03046124 A	05-06-2003	AU	2002365366 A1	10-06-2003
		CA	2466431 A1	05-06-2003
		EP	1453543 A2	08-09-2004
		WO	03046124 A2	05-06-2003
		US	2004136963 A1	15-07-2004

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Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.b of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, the international search was carried out on the basis of:

   a. type of material

   [X] a sequence listing

   [ ] table(s) related to the sequence listing

   b. format of material

   [X] in written format

   [X] in computer readable form

   c. time of filing/furnishing

   [X] contained in the international application as filed

   [X] filed together with the international application in computer readable form

   [ ] furnished subsequently to this Authority for the purpose of search

2. [ ] In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments: